



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1459
Alexandria, Virginia 22313-1459
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,526	12/13/2000	Kazuhito Hatoh	10059-368US	8925

570 7590 12/04/2003

AKIN GUMP STRAUSS HAUER & FELD L.L.P.
ONE COMMERCE SQUARE
2005 MARKET STREET, SUITE 2200
PHILADELPHIA, PA 19103-7013

EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/719,526

Applicant(s)

HATOH ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2003 has been entered. This Office action addresses claim 1 and newly added claims 4-11. The claims are newly rejected under 35 USC §103 herein. This action is non-final.

Claim Rejections - 35 USC § 103

2. Claims 1 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (U.S. Patent 5,284,718) in view of JP 6-132038.

Regarding claim 1, Chow et al. teach a fuel cell comprising an active section and a humidification section (see Fig. 1). Each unit cell in the active section is formed from electrode catalyst layers sandwiching a first polymer electrolyte membrane and separator plates containing reactant grooves (see col. 6, line 49 et seq.). The stack further contains an insulating plate (14), a piston plate (17), current collector (bus) plates (20, 21), and end plates (11, 12). Regarding claims 1 and 8, the humidification section contains humidification units which comprise a second polymer membrane (43) sandwiched by carbon paper sheets (44, 50) and flow plates (41, 39)

(see Fig. 13; col. 10, lines 21-41). The humidification units function by transferring water from a liquid water stream across the membrane to an incoming reactant gas. Regarding claim 4, the first and second polymer membranes are the same (see col. 10, line 25). Regarding claims 7 and 9, a plurality of unit cells and a plurality of humidification units are disposed within the endplates of the stack (see Fig. 1). Regarding claim 10, the humidification units are installed between a current collector plate (21) and the piston plate (17) (see Fig. 1). Regarding claim 11, the humidification units are installed between the insulating plate (14) and an end plate (12) (see Fig. 1). Regarding claims 5 and 6, the first and second membranes may have a thickness of 0.0035 inches (89 microns) (see col. 7, line 16).

Chow et al. do not expressly teach that an incoming gas is contacted with a discharged gas in the humidification units, as recited in claim 1. The reference further does not teach that the thickness of the second polymer membrane is less than 50 or 25 microns, as recited in claims 5 and 6, or that the piston plate is electrically insulating, as recited in claim 10.

In the abstract and Figure 1, JP 6-132038 teaches an apparatus comprising a fuel cell stack (10) in combination with total heat exchangers (11, 21) for concurrently moving heating and humidity from discharged gases toward the incoming fuel and oxidant gases (see abstract; Fig. 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of JP '038 to flow incoming and discharged gases through the humidification units of Chow et al. to effect heat and humidity exchange between the gases. In the abstract, JP '038 teaches that the purpose of the invention is to provide a system in which a "stable amount of

humidification is obtained in accordance with a change in the amount of reaction gas, the miniaturization and the capacity increase of which is easy to make.” Further, in paragraph 18 of the machine translation, JP ‘038 teaches that the apparatus does not need a supply of an external heat source or water, that “easy steam humidification equipment” can be used, and that “the reactant gas which corresponded to change of a load without retardation, and humidified and preheated can be supplied to a fuel cell.” Accordingly, the artisan would be motivated to flow a discharged gas instead of a liquid water stream through the humidifiers of Chow et al. in hopes of obtaining these advantages.

Additionally, the thickness of the membranes is a parameter that is recognized by the prior art as being a result-effective variable. See, for example, column 7, lines 1-20 of Chow et al., which discusses the merits of a thinner membrane. Thus, the artisan would have sufficient motivation to make the membranes thinner than 89 microns, the value disclosed in the passage. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Finally, the artisan would be sufficiently skilled to ascertain that the piston plate (17) of Chow would be electrically insulating, as is required by claim 10. The plate lies outside the area sandwiched by the bus plates (20, 21) which are used to collect current from active section of the stack. An electrically insulating member would be desirable at the end of the stack adjacent to the humidification section in order to prevent electrical current from “leaking” from the end of the stack. Accordingly, the artisan would be able to ascertain that the piston plate (17) has an electrically insulating function.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Epp et al, U.S. Patent No. 5,176,966 (discloses a humidifier with carbon sheets; see column 10, line 5 et seq.).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051 (prior to December 17, 2003) or (571) 272-1299 (after December 17, 2003). The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Jonathan Crepeau
Patent Examiner
Art Unit 1746
November 24, 2003